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The Use of a Combined Antigen–TABTD*†

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THE Royal Canadian Air Force instituted a comprehensive plan of diphtheria immunization early in World War II. This action followed immediately upon an outbreak of diphtheria at a large R.C.A.F. Station in Canada and the finding that one-half of the service population was probably susceptible to diphtheria (Sellers, 1941, 1942). A further factor influencing the decision in this matter was the fact that the risk of exposure in operational theatres was known to be significantly great.

The wartime R.C.A.F. experience with diphtheria immunization was most encouraging, both in Canada and in overseas theatres, and effectively demonstrated the value of diphtheria immunization (Sellers, Caldbick and Hardie, 1948). As a result of this experience, immunization against diphtheria has been continued in the peacetime service—calling for a preliminary Schick test followed by two 1-c.c. doses of alum-precipitated diphtheria toxoid.

It is desirable for the services to achieve the greatest possible simplification of their immunization program while retaining a maximum of effectiveness. Hence, it would be most advantageous to have a diphtheria antigen which could be used without a preliminary Schick test and which would serve as a satisfactory immunizing agent. If such an antigen could be combined with those now given routinely (TABT-typhoid-paratyphoid vaccine with tetanus toxoid), the number of immunization parades would be substantially reduced.

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With this end in view, the field trial of a special antigen combining TABT with a small amount of diphtheria toxoid was undertaken in 1948 by the R.C.A.F. in collaboration with the Connaught Medical Research Laboratories.

Scope and Method of Study

The product used contained the following per c.c.:

S. typhi	750 million
S. para A	250 million
S. para B	250 million
Tetanus toxoid . .	10 Lf
Diphtheria toxoid .	2 Lf

This antigen, designated as TABTD, is essentially the standard TABT now used in the armed services with a small amount of diphtheria toxoid added to it. It was felt that this could safely be given to all recruits without doing a preliminary skin test for susceptibility to diphtheria or sensitivity to diphtheria toxoid.

Method of Procedure

Under the plan, three doses of 1 c.c. each of the special antigen were given at intervals of one month, with a reinforcing dose of 1 c.c. one year after the first dose. Blood samples of approximately 5 c.c. were drawn before the first injection of TABTD, one month after the first injection, again one year after the first injection, and finally one month after the recall dose (i.e., 1 year and 1 month after injection TABTD). The blood samples were sent as quickly as possible to the Connaught Medical Research Laboratories, where the diphtheria antitoxin titrations were carried out and recorded.

The third and fourth blood samples were taken only from those individuals with less than .01 unit of antitoxin per c.c. one month after the first dose of TABTD.

An individual case card was set up for each man included in the series and on this was recorded number, name, age, previous immunization history, including Schick test readings and records of previous inoculation with TAB, tetanus toxoid, TABT and diphtheria toxoid. A record was also made, where applicable, of any previous history of typhoid fever or diphtheria, with the date and severity. The card also contained space for recording the dates and amounts of TABTD given, and the dates and results of antitoxin titres of blood samples.

At the outset 125 men were included in the study, of whom 75 per cent were new recruits and 25 per cent were re-enlisted men from the Navy, Army, or Air Force. The details of pre-enlistment immunization for all men were obtained from the new recruits by personal interview. The previous immunization history of the re-enlisted men was obtained from wartime medical documents.

With a view to ensuring a high degree of continuity over the extended period of the study, one medical officer was made responsible for the direction of the study.

Results

Of the original 125 airmen in the group, it was possible to administer three doses of the combined antigen TABTD to 112. The loss of 13 airmen from the study was due to remote postings and discharges from the service in the interval after the first dose.

Reactions

Throughout the study there was only one reaction of consequence among the 125 men inoculated. This occurred after the first dose of TABTD in a man who gave a previous history of diphtheria toxoid inoculation. The reaction came on about three hours after the injection and consisted of chills, temperature 102°F., pain in back, and headache. This reaction was similar to those occasionally observed with TABT during the war. A subsequent Schick test and toxoid reaction test were negative; this latter finding lends support to the assumption that the reaction was due not to diphtheria toxoid, but to some other constituent of the antigen, e.g. the TAB. This man was given no further inoculations and was not included in the study.

Mild reactions consisting of redness with slight swelling at the site of injection and temperatures of 99-99.6°F. occurred in three men following the second dose.

Antitoxin Levels

The initial diphtheria antitoxin levels before administration of TABTD, in relation to reported or recorded history, are shown in Table I.

TABLE I
DIPHTHERIA ANTITOXIN LEVELS IN 125 MEN BEFORE TABTD
(Units per c.c.)

Toxoid History	<.001	>.001 <.01	>.01 <.1	>.1 <1	>1 <5	>5	Total Men
No toxoid or unknown	16	9	16	9	4	0	54
Toxoid two or more years ago or as a child	7	14	28	12	4	1	66
Toxoid less than two years ago	0	0	0	0	1	4	5
TOTAL	23	23	44	21	9	5	125

Of the original 125 men included in the study, 23 had less than .001 unit of diphtheria antitoxin per c.c. at the outset. One month after the first dose of 1 c.c. of TABTD only nine of the 23 still had less than .001 unit; the remaining four had between .01 and .001 unit per c.c.

Of the entire group of 125 included in Table I, 54 or 43 per cent had no history of previous toxoid inoculation; the remainder had had toxoid according to the history given or to the records examined. Of those with no reported history of having had diphtheria toxoid, 30 per cent (16 out of 54) had less than .001 unit diphtheria antitoxin per c.c. and hence could be considered

as susceptible to diphtheria. Of those who had received toxoid two or more years ago, 10 per cent (7 out of 66) had less than .001 unit per c.c.

It is noteworthy that the five persons who had had diphtheria toxoid within a year prior to bleeding had quite high diphtheria antitoxin levels (Sellers, Baillie and Cruickshank, 1944).

The individuals with less than .01 units per c.c. might be considered as susceptible to diphtheria and hence comprise the essential group in assessing the efficacy of the antigen. In this study this group includes 23 individuals with less than .001 and 23 with greater than .001 but less than .01 unit per c.c. Subsequent diphtheria antitoxin titrations were confined to this group.

The antitoxin levels one month after the first dose of TABTD are given in Table II.

TABLE II

ANTITOXIN LEVELS ONE MONTH AFTER ONE DOSE TABTD

(Units per c.c.)

Initial Antitoxin Level	<.001	>.001 <.01	>.01 <.1	>.1 <1	>1	Total Men
<.001	9	4	1	4	4	23*
>.001 <.01	0	1	1	6	15	23

*One case lost.

The data in Table II provide excellent evidence of the efficacy of the TABTD used in respect of diphtheria toxoid as a secondary stimulus. This evidence arises from the fact that all but one of the 23 men with more than .001 but less than .01 unit antitoxin per c.c. before receiving any TABTD, had substantial increases in diphtheria antitoxin levels one month after the first dose of TABTD; one still remained at less than .01 unit per c.c. With 15 of the 23 men the antitoxin levels rose to more than one unit per c.c.

Of the 23 men (Table II) with initially <.001 unit per c.c., 9 still had <.001 unit per c.c. one month after one dose of TABTD and 4 had increased to >.001<.01 unit per c.c. Of these latter 4 men with >.001<.01 unit one month after one dose of TABTD, one was lost sight of and the 3 others showed an increase in antitoxin to >.01 unit per c.c. after 3 doses of antigen.

Of the 9 men with <.001 unit per c.c. one month after one dose of TABTD, all still had <.001 unit per c.c. after 3 doses when tested one year after the first dose. One month after a reinforcing dose of 1. c.c. TABTD, 4 of the 9 men still had <.001 unit per c.c., one had >.001<.01 unit, and 4 had >.01 unit. None of these nine men gave a history of having had diphtheria toxoid previously.

The objective of the study was to see whether or not the product in its present form was of sufficient antigenic potency to produce a satisfactory amount of antitoxin in individuals who had had no previous contact with diphtheria or with diphtheria toxoid.

While the evidence adduced from this study is encouraging, it should be noted that of the 23 individuals who had less than .001 unit of antitoxin per c.c. blood before the first injection of TABTD, 4 still had less than .001 unit per c.c. one month after a reinforcing dose given one year after the beginning of the first course of inoculations.

Discussion

The successful application of a combined antigen such as the one under trial would be of great administrative importance to the armed services. Besides effecting a substantial economy, it would make possible the reduction from 8 to 3 in the number of injections receivable by each new recruit during his first two months in the service. More important still, any effective material developed would have widespread civilian defence application.

The finding that 4 of the 23 men with less than .001 unit diphtheria antitoxin per c.c. before the administration of TABTD still had less than .001 unit one month after a reinforcing dose suggests the need for a more highly antigenic diphtheria toxoid material. None of these 4 gave any history of having had toxoid previously, so that these 4 "failures" may be considered in relation to the 16 negative history cases with less than .001 unit before TABTD (Table I).

The success of the product used as a secondary stimulus, the absence of any significant reactions, and the encouraging evidence that a product which meets service requirements may be developed which will provide an adequate primary stimulus as well, warrants further investigation in this field.

It is proposed, therefore, to extend the study, using a diphtheria antigen of greater potency combined with TABT, to a group of sufficient size to ensure the inclusion of at least one hundred persons with less than .001 units of diphtheria antitoxin per c.c. at the outset. This broader field trial will be conducted on a tri-service basis and will afford a better assessment of the question of reactions as well.

Summary

1. The need for continuing the diphtheria immunization program in the R.C.A.F. was established by the experience gained during the war years.

2. The necessity for simplifying the technique of administration led to the idea of developing a special combined antigen in which a small dose of diphtheria toxoid is combined with TABT.

3. A study conducted by the R.C.A.F. in collaboration with the Connaught Medical Research Laboratories to determine the efficiency of a special combined antigen (TABTD) has met with encouraging results.

4. No significant reactions have been encountered with the product used to date.

5. It is proposed to extend this study, on a tri-service basis, to a larger group, using a diphtheria antigen of greater potency.

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Prolonged Survival of Human Poliomyelitis Virus in Experimentally Infected River Water*

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POLIOMYELITIS virus is discharged in considerable quantity in the faeces of patients, and there are obvious opportunities for the contamination of water supplies. Kling, from observations in Sweden and other European countries, has supported the concept of poliomyelitis as a water-borne disease (3, 4). The majority of workers, however, would agree with Maxcy (7) who, after carefully reviewing the position, concluded that there was insufficient evidence to justify the belief that water is a medium of any practical importance in the spread of this disease. Nevertheless, it is probable that under certain conditions in country districts sporadic cases of the disease may be contracted from polluted water used for drinking, washing, or swimming (1, 11). It is also possible that prolonged survival of poliomyelitis virus in infected water may have some bearing on the carry-over of infection from one season to another despite the apparent absence of human cases.

In regard to survival, it was shown many years ago that human poliomyelitis virus, in the form of a suspension of monkey cord, remains infective for at least a month when added to water and stored at room temperature (6). More recently, using a suspension of cord suspended in tap water, it has been reported that virus survives for at least 114 days at room temperature in the dark (5). Studies on the survival of poliomyelitis virus in the form of a dilute watery suspension of stool obtained from a case of the disease do not appear to have been reported hitherto.

The object of the present study is twofold: first, to study the survival of poliomyelitis virus in a dilute watery suspension of infected human stool; second, to investigate the most suitable technique of recovering poliomyelitis virus from dilute suspensions. Apart from an instance difficult to interpret, because the results of monkey inoculations were not quite typical (4), human poliomyelitis virus has never been isolated from naturally infected water supplies. The availability of an improved method of virus recovery would provide a stimulus to the investigation of water supplies obtained at the

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source of outbreaks of the disease, and a re-examination of the possible role of water. In this report we shall describe the prolonged survival of poliomyelitis virus under experimental conditions. The question of the most suitable technique of virus recovery is now under active study.

Technical Methods

Preparation of stool suspension

We had available the stool of a child, S.C., suffering from paralytic poliomyelitis (10). Shortly before use in the present study, an etherized preparation was inoculated in a rhesus monkey and, confirming earlier tests, it induced experimental poliomyelitis, typical clinically and histologically.

The river water used as diluent was collected in February 1949, during a temporary thaw, from a country stream near the laboratory grounds. The initial pH was 7.98, and this figure altered little on storage. It was assumed that this water contained no poliomyelitis virus.

A quantity of 22 gm. of the stool of S.C. was thoroughly mixed with 4,000 ml. of this water in a glass container, thus giving a dilution of the original stool of approximately 1:200. The bottle was stored in the cold room at about +4°C., and was only subjected to light or room temperature when brought to the laboratory for sampling. Samples were withdrawn at intervals of 29, 61, 98, and 188 days after preparation. Nothing at all was added to the original sample during this 6-month period.

Detection of virus

The object of any method of treatment of specimens is to remove or destroy all bacteria so as to allow of the final material being inoculated by the sensitive cerebral route in monkeys. Further, the virus should be concentrated and contained in not more than 2 ml. of fluid, as 1 ml. is the maximum quantity that can be injected cerebrally; if a large volume results, resort must be had to the less sensitive peritoneal route of inoculation.

Three methods are available for the detection of poliomyelitis virus in large volumes of fluid such as water or sewage.

(1) The simplest method, which does not, however, concentrate virus, is to shake with ether to destroy the majority of bacteria; this technique is widely used in the examination of sewage. Before ether treatment, the volume of the sample may be reduced very appreciably by evaporation *in vacuo* at a low temperature (4).

(2) Another relatively simple method also used in sewage examination, which has the advantage of concentrating virus, is to add egg protein or serum and deposit the protein along with any virus by means of ammonium sulphate (2, 8).

(3) Probably the most efficient method is to concentrate the virus by the ultracentrifuge; all the virus contained in a considerable amount of water may then be taken up in about 1-2 ml. of fluid after deposition.

As we are engaged in this laboratory in investigating the value of the ultracentrifuge for recovering poliomyelitis virus from dilute suspensions, it was found convenient to make all the tests now reported by inoculation of fractions prepared by ultracentrifugation.

The ultracentrifuge used is the model designed by Pickels (Specialized Instruments Corporation, Belmont, California) and now commercially available. A description of this instrument, with a diagram, is available (9). The head of this instrument holds 12 plastic tubes with a capacity of 30 ml., so that a total of 360 ml. can be centrifuged in one "run". The speed of centrifugation is 39,460 r.p.m., and the force developed is 170,000 times gravity. Before subjecting any sample to ultracentrifugation, it was first centrifuged at 3,800 r.p.m. for one hour on an ordinary horizontal instrument. The supernatant was then subjected to ultracentrifugation for a period of one hour. The deposits from the tubes in the ultracentrifuge were suspended in a small quantity of sterile saline (usually less than 2 ml.). Removal of bacteria was carried out by shaking with ether, followed by centrifugation at 1,500 r.p.m. for 15 minutes; finally, if these steps did not destroy all bacteria, penicillin and streptomycin were added. The ultracentrifuge deposit was inoculated nasally (1 ml.) or cerebrally (0.3 to 0.5 ml. in each thalamus) in monkeys. Each sample was injected in one rhesus monkey. It has not yet proved possible to measure the amount of poliomyelitis virus deposited in these centrifugation procedures. Accordingly, it is now our practice to inoculate the monkey with 3 fractions deriving from each sample tested, so as to lose as little of the total virus as possible. The high-speed deposit, containing most of the virus, is injected cerebrally, and the low-speed deposit (3,800 r.p.m.) and the supernatant of the high-speed centrifugation, after appropriate etherization, are pooled and injected intraperitoneally. In this way, the monkey receives virtually the whole virus content of the 360-ml.

SURVIVAL OF HUMAN POLIOMYELITIS VIRUS IN RIVER WATER

Period of storage	Quantity of water centrifuged	Material inoculated in monkey	Result of monkey inoculation
29 days	1000 ml.	High-speed deposit (in 1 ml.) given nasally	Became paralyzed after 12 days; histology typical of poliomyelitis
61 days	180 ml.	High-speed deposit (in 1 ml.) given cerebrally; low-speed deposit given peritoneally	Became paralyzed after 14 days; histology typical of poliomyelitis
98 days	360 ml.	High-speed deposit (in 0.6 ml.) given cerebrally; low-speed deposit plus supernatant of high-speed centrifugation given peritoneally	Became paralyzed after 7 days; histology typical of poliomyelitis
188 days	360 ml.	High-speed deposit (in 0.8 ml.) given cerebrally; low-speed deposit plus supernatant of high-speed centrifugation given peritoneally	Developed preparalytic phase 9 days after inoculation, and became paralyzed 14 days after inoculation; histology typical of poliomyelitis

sample, the fraction containing most of the virus being injected by the sensitive cerebral route. All inoculated animals were killed when paralysis was noted, and the brain and cord were removed for histological examination. The final diagnosis rested on the finding of histological lesions typical of poliomyelitis in the rhesus monkey.

Results

The results of sampling the original diluted stool at various intervals are shown in the table. It will be seen that after 188 days' storage in the cold, virus was still readily detected, and that the three earlier tests were likewise positive. In so far as one can judge by the length of the incubation period in the inoculated monkeys, there is no evidence that the effective amount of virus has decreased to any recognizable degree, over a period of 188 days. It is, of course, possible that over the period of storage, original aggregates of particles have become broken down into smaller infective units.

Conclusions

We have shown that a strain of human poliomyelitis virus in stool survives after addition to river water for at least 188 days, and retains its property of inducing paralysis in rhesus monkeys. Storage of the infected water was at approximately +4°C., and the dilution of the human stool was about 1:200. The material was prepared by ultracentrifugation, and after treatment of the deposit with ether and antibiotics, the material could be inoculated cerebrally in monkeys. The fact that poliomyelitis virus can survive for such a prolonged period under experimental conditions would seem to have some epidemiological implications. The use of the high-speed centrifuge affords a means of examining water samples collected in field studies.

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ADDENDUM

Since this paper was submitted for publication, samples removed after storage at 216 and 315 days have been examined by methods similar to those described above. No poliomyelitis virus has been detected in these samples, indicating that infectivity was lost in the stored sample somewhere between six and seven months after the start of the experiment.

Letter from Great Britain

The Sanitary Inspector in Great Britain

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SOCIAL and preventive medicine in Great Britain has had no more effective agent than the sanitary inspector. Yet it is possible to search through all the classical accounts of its history and development from Simon's 'Sanitary Institutions' to Newman's 'Rise of Preventive Medicine' without finding a single reference to his work. It is difficult not to conclude from this one more evidence of the failure of the medical profession to understand the importance of the application of medical teaching to the preventive field. The sanitary inspector began under the title of 'inspector of nuisances'. The Liverpool Sanitary Act of 1846 (which gave the Liverpool Town Council power to appoint a medical officer of health) gave a parallel power to appoint one or more persons to be called the Inspectors of Nuisances, who should 'superintend and enforce the due execution of all duties to be performed by the scavengers appointed under the Act and to report to the said council and health committee all branches of the bye-laws, rules and regulations . . . and to point out the existence of any nuisances'.

So began one of the most valuable members of the health team whose range of work and importance were to grow and extend as public health statutes increased the measures to make environmental hygiene effective. It is not clear when or how the name became changed to sanitary inspector. It was used in the Public Health (Scotland) Act, 1867. Lord Shaftesbury, speaking before a Royal Commission in 1884, used the term when he said "nor were the sanitary inspectors as efficient as they might have been, though there had been a great improvement in the class of man appointed"; but it was not officially recognised until 1891 for London (Public Health (London) Act) and not until 1921 for the rest of England and Wales (Public Health (Officers) Act).

The Public Health Act of 1848 required all Local Boards of Health created by it to appoint inspectors of nuisances, and this was made general for the whole country in 1872 coincidentally with the overall health cover then created by the appointment of medical officers of health to all the new local authorities. This new opportunity to recruit skilled technical advisers to the new health departments was not entered upon with any great enthusiasm.

In Bethnal Green in 1861, with a population of 105,000 persons and 14,731 houses, there was one inspector of nuisances; Shoreditch, St. Georges, Paddington, Bermondsey, and several other Vestries likewise had one inspector each; in the whole metropolis in 1885 there were 103 inspectors of nuisances—a rough average of one for each 40,000 of the population. 'Consistently,' one reads, 'and year after year, did the bulk of medical officers of health complain of the lack of sufficient sanitary inspectors, and point out the necessity for more; some begged for them—but to nearly all their appeals the Vestries turned a deaf ear'. No doubt what was true of the London Vestries (which preceded the boroughs as health authorities) was true of all Britain.

Neither the Act of 1848 nor any subsequent statute, order or regulation, before a date well into this century, required any formal qualification. The Act of 1848 referred only to 'fit and proper persons'. Regulations were issued from time to time defining the scope of work but nothing more. In 'The Sanitary Evolution of London' (Henry Jephson, L.C.C.) one reads that in 1869 'The Sanitary Inspector was an unskilled workman, holding that which might almost be regarded as a sinecure office; an official recruited into the services of the Vestry from the rank of ex-sailors, ex-policemen or army pensioners. A knowledge upon sanitary matters acquired from a course of technical training was expected from him.' London was the first in 1891 to require a qualification for the sanitary inspector, using the training and certificate evolved towards the turn of the century by the Royal Sanitary Institute. (The first examination of inspectors of nuisances was held by the Institute on 29th October, 1877, following the first course of training of the previous year.) The certificate of this body (founded in 1876 and then, as now, concerned with the training of auxiliaries working in the health field) was recognised for general enforcement by the Sanitary Officers Order of 1922. It has been customary for a number of additional qualifications to be held, such as a certificate of meat inspection and other foods, a certificate in sanitary science as applied to buildings and other work, a certificate in builders quantities, a certificate in smoke inspection; diplomas can also be obtained for the Institute of Sanitary Engineers, the Institute of Public Cleansing, and the Royal Institute of Public Health and Hygiene.

All those engaged in work to improve environmental hygiene have been faced with the problem of vested interests. In 1884 the medical officer of health of Fulham wrote: 'So many are the vested interests that sanitary officers are obliged in the performance of their duties to interfere with that they must be prepared to meet with injustice and opposition in almost all directions. It is not surprising that the dwellings of the poor in London should be in such an insanitary condition seeing the great obstacles public sanitary officers have in the performance of their duties.' Percy Boulnois, speaking of 'Sanitary Progress during the fifty years 1876-1926' at the Jubilee and London Congress of the Royal Sanitary Institute in 1926, described some of these conditions:

"It will be impossible to describe the defects of some of the sewers that then existed. Old brooks and ditches had been utilised, arched over, and occasionally inverted. They were winding and tortuous, full of fissures and holes and were little better than elongated

cess-pools. In surveying and levelling them for future improvements, I frequently fell into holes over my long sewer boots, an unpleasant experience. There were but few means of access and little or no ventilation. . . . .

"In many cities and towns there were but few sewers—cess-pools, privies, and middens abounded. In some towns, even to a much later period, what was called the 'interception' or 'dry process' was much favoured, chiefly on account of the cost of constructing sewers. . . . The faecal matters and urine were stored in buckets, or pails, in the dwellings, and collected periodically by the Local Authorities in specially constructed covered wagons, conveyed to a depot where the contents were converted into fertilisers. A disgusting and insanitary process which lasted much longer than it should have done. The advocates of this process overlooked the fact that slop water is as offensive as domestic sewage. . . .

"A large proportion of the house drains 50 years ago consisted of brick barrels, stone channels, or earthenware pipes, badly laid and jointed. Only a few years previously, some of the leading architects of those days had insisted that house drains should be constructed of sufficient size to enable a man to crawl through them to cleanse them. . . . They had no intercepting traps."

For the effective discharge of duties in such circumstances the need for protection was obvious and indeed strongly recommended in the findings of the Royal Commission of 1869. In due course this protection has been afforded and no senior sanitary inspector (as indeed no medical officer of health) with the exceptions of a few county boroughs can today be removed from office without the consent of the Central Authority.

Sanitary inspectors have grown steadily in numbers and importance. In the West Riding of Yorkshire today, with 1½ million people, there are approximately 170 sanitary inspectors, and the number for England and Wales probably does not fall short of 5,000. Whereas all county boroughs and county districts must appoint sanitary inspectors, county councils are not so obliged but in general have done so. 'Sanitation is the practical application of the science of hygiene to the varied conditions of life,' as an Army Manual concisely states. The science of sanitation nevertheless cannot be exactly defined, for within its scope are chemistry and physics, engineering and architecture, bacteriology and pathology, epidemiology and sociology. The person with an overall interest in all these factors is, of course, the medical officer of health, but he has as his right-hand man in matters of sanitation the sanitary inspector who, by the Sanitary Officers (Outside London) Regulations, 1935, performs his statutory duties under his general direction.

Much of the sanitary inspector's work is statutory. He is, in fact, a creature of statute created to serve the Goddess Hygeia. The outlines of his businesslike frame with its purposeful gait and the clean-cut honest look on his countenance can be seen drawn in close detail in our sanitary code. In a great profusion of sections, articles and paragraphs his presence is invoked or inferred, of which the following are but a small sample. Every local authority, says section 91 of the Public Health Act, 1936, must cause their district to be inspected from time to time for the detection of nuisances. Every local authority, says section 111, must ascertain from time to time the sufficiency and wholesomeness of the water supplies within their district and must see that so far as practicable every house has available within a reasonable distance a supply of wholesome water for domestic purposes. Every local authority,

says section 72, may, and if required by the Minister shall, undertake the removal of home refuse, and the cleansing of earth closets, privies, ashpits and cesspools. Where, in the opinion of an authorised officer of a local authority (and the sanitary inspector is invariably constituted as such) a smoke nuisance exists, he shall as soon as practicable notify the occupier of the premises and, if necessary, confirm the notification in writing within 24 hours. Before granting a licence for slaughter houses and knackers yards a local authority must have the premises inspected by one of their officers. No one may remove a carcass or the organs (other than the stomach, intestines and bladder) from a slaughter house till after inspection. The sanitary inspector as an authorised officer under the Food and Drugs Act, 1938, 'may at all reasonable times examine any food intended for human consumption and, if it appears to him to be unfit for human consumption, may seize it and remove it in order to have it dealt with by a Justice of the Peace'. An authorised officer, commonly the sanitary inspector (known as a 'sampling officer') of a Food and Drugs authority, may procure samples of food and drugs for analysis or for bacteriological and other examination. 'It is the duty,' says the Housing Act, 1936, 'of every local authority to have their district inspected from time to time to ascertain whether any dwelling house is unfit for human habitation and this must be done by the medical officer of health or by an officer under his supervision.' The range of duties is very wide. Articles 27 and 28 of the Sanitary Officers (Outside London) Regulations, 1935, which define their duties are given for the sake of reference as an appendix, together with a statement of duties coming within his province under the Public Health Act, 1936.

There has been a tendency in recent years for sanitary inspectors to seek autonomy from the medical officer of health. The Sanitary Inspectors Association, his official organ, would prefer to see themselves set up as heads of separate departments. No doubt, if the medical officer of health exercises a meticulous and pin-pricking control of the work of the sanitary inspector, resentment and frustration will develop, but where the medical officer accepts 'his general direction' in the widest sense, leaving the routine duties to be carried out by the sanitary inspector in his own way, a happy co-operation results. After all, the medical officer of health must respect the particular training in sanitary science which the sanitary inspector receives to fit him for his duties and must expect to be advised by him as he is by other specialists. The relationship of the sanitary inspector to the health department is still of the greatest importance and dichotomy must not be permitted. The sanitary inspector's work is not sufficient to stand on its own as a separate department and if he were to break away from the medical officer of health he might find himself attached to that of the engineer or architect, thus losing his true function as a means of preventing ill-health and possibly passing out of existence altogether.

The changing face of preventive medicine has not been entirely favourable to the sanitary inspector. His job is composed of so many different elements that it is perhaps natural that he should have been deprived of some functions by the growth of specialism. An example of this can be seen in the field of milk hygiene. Since the first attempt to regulate dairies and cowsheds (in

1879) the sanitary inspector has become an expert in the hygiene of milk production and dairies, undertaking work which has steadily grown in importance as our legislation has become more detailed and particularly with the licensing of special grades of milk. The veterinary surgeon who has since developed has begun to look askance at another professional officer engaged in his field of work. The Food and Drugs (Milk and Dairies) Act, 1944, has now transferred the farm side of milk production to the Ministry of Agriculture and removed from local authorities all hygiene work concerned with farms, leaving to them only the duties of supervising distribution of milk and the licensing of pasteurising plants. The same process is operating in the field of epidemiology. The sanitary inspector began in the days of the great pandemics when isolation and disinfection were necessary measures. Frazer, in his 'Duncan of Liverpool,' tells us how for the whole period of his 16 years' work in the city (after 1847) Dr. Duncan and his one inspector of nuisances strove alone against onslaughts of cholera, typhus and typhoid. 'Amidst appalling poverty, more appalling habits of living, and orgies of the basest description, with three-quarters of a million persons living per square mile in the worst parts of the town, with 40,000 of the total quarter-million persons in stagnant cellars and 55,000 in airless courts, he watched typhus and typhoid carry off thousands to the overcrowded cemeteries where graves were emptied of their contents to make way for fresh arrivals.' From then till now it has always been his job to help the medical officer of health to trace infection and to undertake removals to hospital and disinfection of articles and houses. With the great changes in the incidence of infectious diseases much of this work is now coming to an end. Coincidentally under the National Health Service Act of 1946 the health visitor is made responsible 'for giving advice in the prevention of the spread of infection.' Some Food and Drugs authorities are appointing sampling officers who are not sanitary inspectors, so that the work can be done jointly with that of weights and measures. Advice on water supplies is becoming increasingly a task for specially qualified water engineers. Surveyors and architects are taking a greater interest in the housing legislation.

This trend of events has been thought by some to spell the end of the work of the sanitary inspector, yet environmental conditions are still at the bottom of much illness despite the operation of sanitary legislation for a hundred years. Bad housing, with inadequate ventilation, dampness, overcrowding and congested sleeping quarters, absence of proper water supplies and baths, diseased and infected foods, adulterated foods; insanitary work places and offices with harmful dusts and spreading infections; smoky atmospheres and lack of sunlight; overflowing dustbins and cesspools; insanitary earth closets; polluted water and milk supplies—all these make the conditions in which disease flourishes, and against all these the sanitary inspector is needed to wage a continual warfare. The environmental conditions of Britain, although so greatly improved, still call insistently for the strict surveillance of health departments and they still need the work of that kindly, good-humoured, all-purpose hygiene officer, the sanitary inspector, who by his skill and integrity has contributed so much to the present high standards of health in Britain.

APPENDIX

Article 27, Sanitary Officers (Outside London) Regulations, 1935—Duties of sanitary inspectors.

The sanitary inspector as regards the district for which he is appointed shall, except as provided by Article 28 of these Regulations—

(1) perform under the general direction of the medical officer of health all the duties imposed on a sanitary inspector by statute and by any orders, regulations or directions from time to time made or given by the Minister, and by any byelaws or instructions of the local authority applicable to his office;

(2) by inspection of his district, both systematically and at intervals as occasion requires, keep himself informed of the sanitary circumstances of the district and of the nuisances therein that require abatement;

(3) report to the local authority any noxious or offensive businesses, trades or manufactories established within his district, and the breach or non-observance of any byelaws or regulations made in respect thereof;

(4) report to the local authority any damage done to any works of water supply or other works belonging to them, and also any case of wilful or negligent waste of water supplied by them, or any fouling gas, filth, or otherwise of water used or intended to be used for domestic purposes;

(5) from time to time and forthwith upon complaint, visit and inspect the shops and places kept or used for the preparation or sale of any article of food to which the provisions of the statutes and regulations in that behalf apply, and examine any article of food therein, and take such proceedings as may be necessary:
Provided that in any case of doubt arising under this paragraph, he shall report the matter to the medical officer of health, with the view of obtaining his advice thereon;

(6) if so directed by the local authority, carry out the duties of a sampling officer under the Food and Drugs (Adulteration) Act, 1928;

(7) if so directed by the local authority, inspect premises used as dairies for the purposes of the Milk and Dairies (Consolidation) Act, 1915, or the Milk and Dairies (Amendment) Act, 1922, or any Act amending those Acts, and any Orders or Regulations made thereunder;

(8) give immediate notice to the medical officer of health of the occurrence within his district of any infectious or epidemic disease or other serious outbreak of illness; and whenever it appears to him that the intervention of such officer is necessary in consequence of the existence of any nuisance injurious to health, or of any overcrowding in a house or of any other condition affecting the health of the district, forthwith inform the medical officer of health thereof;

(9) if so directed by the medical officer of health, remove, or superintend the removal of, patients suffering from infectious disease to an infectious diseases hospital, and perform or superintend the work of disinfection after the occurrence of cases of infectious disease;

(10) if so directed by the local authority, supervise the scavenging of his district or any part thereof;

(11) if so directed by the local authority, act as officer of the local authority under the Canal Boats Acts, 1877 and 1884, and the Rats and Mice (Destruction) Act, 1919, and under any order or regulations made thereunder;

(12) if so directed by the local authority, act as designated officer for the purposes of the Housing Consolidated Regulations, 1925 and 1932;

(13) if so directed by the local authority, perform duties of inspection under Part 1 of the Housing Act, 1935;

(14) if so directed by the local authority, superintend and see to the due execution of all works which may be undertaken by their direction for the suppression or removal of nuisances;

(15) carry out any duties imposed upon him by the local authority with reference to the provisions of the Shops Act, 1934, relating to ventilation, temperature and sanitary conditions;

(16) enter from day to day, in a book or on separate sheets or cards provided by the local

authority, particulars of his inspections and of the action taken by him in the execution of his duties;

(17) at all reasonable times, when applied to by the medical officer of health, produce to him his books, or any of them, and render to him such information as he may be able to furnish with respect to any matter to which the duties of sanitary inspector relate; and

(18) as soon as practicable after the 31st December in each year, furnish the medical officer of health with a tabular statement containing the following particulars—

(*a*) the number and nature of inspections made by him during the year;

(*b*) the number of notices served during the year, distinguishing statutory from other notices;

(*c*) the result of the service of such notices.

Article 28 of the Regulations of 1935 enables a local authority to distribute among their sanitary inspectors the various duties prescribed in Article 27, supra.

Duties coming within the province of the Sanitary Inspector under the Public Health Act, 1936.

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(38) Drainage of buildings in combination; (39) Provisions as to drainage, etc., of existing buildings; (40) Provisions as to soil pipes and ventilating shafts; (41) Notice to be given of repair, etc., to drains; (42) Alteration of drainage system; (43) Closet accommodation for new buildings; (44) Insufficient closet accommodation; (45) Defective closet accommodation; (46) Sanitary conveniences for factories, etc.; (47) Conversion of closet accommodation; (48) Examination and testing of drains; (49) Rooms over closets, etc., not to be used as living, sleeping or work rooms; (50) Overflowing or leaking cesspools; (51) Care of closets; (52) Care of sanitary conveniences used in common; (56) Yards and passages to be paved and drained; (72/82) Removal of refuse, scavenging, keeping of animals, etc.; (83/85) Verminous premises, articles and persons; (88) Control over conveniences in, or accessible from, streets; (89) Power to require sanitary conveniences to be provided at inns, refreshment houses, etc.; (91/110) Nuisances and offensive trades; (137) New houses to be provided with supply of water; (138) Power of local authority to require any occupied house to be provided with sufficient water supply; (140) Power to close, or restrict use of water from, polluted source of supply; (141) Insanitary water cisterns; (154) Rag and bone dealers; (235/241) Common lodging houses; (249/255) Canal boats; (259/266) Watercourses and streams; (267) Ships; (268/270) Tents, vans, sheds, fruitpickers' lodgings.

The Teaching of Clinical Preventive Medicine

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TEACHERS who are responsible for the instruction of medical students in the prevention of disease and the promotion of health have used various names to designate their courses, and have defined the content in different ways. To some the term "preventive medicine" is all-inclusive and is synonymous with hygiene, social medicine, and similar titles. Others use the words "preventive medicine" to define that portion of the health field which is largely the responsibility of the general physician, as distinguished from public health. I shall use the term "clinical preventive medicine" in this latter or limited sense.

The entire field of health study includes not only activities aimed at the prevention of disease and disability—which suggests the rather negative attitude that health is the mere absence of disease—but also those aimed at developing the maximum of physical and mental fitness in individuals or groups—a more positive concept. Medical activities in this broad field are the responsibility of two major groups of the medical profession, the specialists in public health and the general practitioners of clinical medicine. The aims and ideals of these two groups are similar in many fundamental respects but the areas of responsibility and the methods of operation differ extensively. For this reason it is desirable to have separate terms to designate the field of study dealing with each branch, and the titles "public health" and "clinical preventive medicine" may be so employed, although in fact the latter includes more than the study of preventive procedures per se and takes in also the more positive procedures aimed at the promotion of health.

Public health, then, encompasses those activities undertaken for the prevention of disease and the promotion of health which are the responsibility of the community. These are the prime concern of such public health specialists and other personnel as are engaged by the community for this purpose. Clinical preventive medicine comprises those activities for the prevention of disease and promotion of health which are the responsibility of the individual or, in the case of children, of the head of the family; they are therefore also the responsibility of the family medical practitioner from whom advice is sought. In my opinion, any medical school which aims at the teaching of general practitioners—and that should probably include all undergraduate schools—should place the greater emphasis on clinical preventive medicine.

Part of a Symposium on the Teaching of Public Health and Preventive Medicine, presented at the seventh annual meeting of the Association of Canadian Medical Colleges, held in Quebec September 16 and 17, 1949.

A student who is to become a practitioner of general medicine, or of one of the clinical specialties, needs to learn just as much detail and requires adequate clinical practice to acquire skill in preventive medical procedures, as he does in the other two major clinical arts, the diagnosis and treatment of disease. On the other hand, in public health, as in any other specialty, only the fundamental principles need to be understood, not the details of procedures which will be the responsibility of public health specialists. In this field the purpose of the teacher should be to provide the student with the following:

(1) A sufficiently broad outline of the subject that he may be able to decide intelligently whether he might like to specialize in public health after graduation.

(2) An adequate knowledge of the clinical and laboratory consultation services provided by the departments of health, of which the clinical practitioner may take advantage for the benefit of his patient, just as he would use other consultation services.

(3) A detailed knowledge of those few aspects of public health which are set by law as the responsibility of the practising physician, such as the reporting of certain communicable diseases.

(4) A broad understanding of the aims and ideals of the public health specialist and of his relation to the general practitioner and to the community, in order that the student, as a future practitioner, may be more likely to give the same degree of sympathetic support and cooperation that he is expected ethically to give to his confrères in other fields of medicine. Requirements for post-graduate training and for certification in the specialty of public health are now sufficiently high, and the value of past efforts has been so definitely established, that it is time medical students were made aware of the high standing of this specialty in order to counter the outmoded but still prevalent idea among clinicians that only the sick, the lazy, or the dull-witted enter this field of medicine.

These are, in my opinion, the only features that need to be covered in a public health course, and almost all can be presented incidental to the teaching of clinical preventive medicine.

It is a relatively recent concept that the practitioners of general medicine, and of some of the clinical specialties as well, should be responsible for the health of the persons under their supervision, and not merely concerned with the diagnosis and treatment of their illnesses. It is so new an idea that it has not yet permeated any considerable proportion of the medical profession. Many of those physicians who cry most loudly that public health departments are "stealing their practice" do very little to incorporate a preventive service as an integral part of their day-to-day practice, and pay only lip service to its aims. Students should leave medical school with the attitude that the health of the family unit is their responsibility, not merely the illnesses of its individual members. Progress in prevention has in the past been largely a result of the efforts of organized public health agencies. If progress is to continue, the family unit must be more effectively reached. In addition, the continued encroachment of governmental and voluntary health organizations into clinical medicine will not be stopped simply by protests of the clinicians, but

rather by their acceptance of responsibility for duties which many have not been performing to the best of their ability in the past. The teaching of clinical preventive medicine therefore requires not only the presentation of a useful body of knowledge, but aims at inculcating a mode of thought—a philosophy of medical practice.

In July, 1945, the Association of Internes and Medical Students of the United States presented an analysis of over one thousand questionnaires from medical students or graduates with a view to determining reactions to present-day teaching. It is not suggested for one moment that preventive medicine should be groomed to enter a student popularity contest, but it may be of some interest and possibly of some significance that embryology and public health were most frequently suggested as requiring less emphasis. At the Conference on Preventive Medicine held at the University of Michigan in 1946, several speakers complained that it was extremely difficult to interest a third-year medical student in anything that was not directly related to a patient. This fact was bemoaned as the cause for the unpopularity of the course.

I think that these facts indicate clearly the major weaknesses in our past teaching of preventive medicine. Any teacher who is presenting a course to third- or fourth-year medical students which he does not or cannot relate to patients, is teaching the specialty of public health—not clinical preventive medicine. The intelligent student recognizes this, and even the less intelligent one fails to see how he can make use of the facts presented. Interest is lost in the whole subject, and only in later years of practice does the realization come that parts of the course would have been of practical value to the clinician. Too often courses called "preventive medicine" are taught by a specialist in public health who presents a miniature D.P.H. course, rather than one planned with a realistic view as to the needs of the future practitioner of clinical medicine. This is not an ailment that is specific to teachers of preventive medicine. Pathology is often taught in voluminous detail which would be more valuable to future pathologists than to future general practitioners. Even enthusiastic surgeons have been known to spend so much time describing in detail the techniques employed in an interesting operative procedure that the student failed to appreciate what were for him more important features of treatment, possibly the most important being the realization that this was an operation he should not undertake at all, but should refer to a specialist.

Medicine is such a tremendous and growing subject that the specialists on the staffs of undergraduate medical schools must be persuaded to restrain their enthusiasm and be satisfied with a presentation to medical students of something less than their total fund of knowledge on any subject. This is certainly true of the public health specialists in some medical schools, who have not reflected long enough to recognize that most medical students will never need to know the details of a flow diagram of milk through a pasteurizing plant or the engineering details of an Imhoff tank, although they do need to understand the general principles of pasteurization and sewage disposal.

Lack of student interest in part or all of a course of clinical preventive

medicine is primarily the fault of the teacher, not the students. It is a basic principle of teaching that the first step in presenting any lesson is motivation of the student, stimulating his desire to learn what is to be presented. Many medical teachers apparently act on the assumption that, because students are interested enough to enter medicine, they are equally interested in all courses prescribed by Faculty and even in every aspect of each subject. This is, of course, not true. Every lecture, every seminar discussion, every laboratory exercise would be more effectively presented and more readily absorbed by the student if he were made to see some use for it or was otherwise impressed with the desirability of applying some interest and effort toward its acquisition. He is unlikely to be completely satisfied with the grandmotherly advice, which often accompanied a bitter potion: "Take this. It is good for you." In my opinion, our courses in preventive medicine would be much improved if we quietly dropped those portions of our teaching material for which we could not think of an effective motivating stimulus that would appeal to the future practitioner of medicine. The most effective stimulus is to relate what is to be discussed or presented to a typical problem of medical practice, either by presentation of a case or by an outline of a situation such as the student will meet in general practice.

In other words, I believe that emphasis should be placed on the clinical aspects of preventive medicine because these are the facts a future clinician should know—and most of our students will be clinicians, not public health specialists—and because they also form the strongest motivating force to stimulate the student to grasp the general principles of public health and, in fact, the aims and ideals of the whole field of social or humanistic medicine.

The teaching of clinical preventive medicine should not be confined to one department of the medical school. As already stated, it is a body of knowledge and of procedures to be employed in day-to-day practice together with the diagnosis and treatment of disease. If we are to gain full acceptance for this radical extension of the physician's duties and responsibilities, preventive medicine must become an integral part of the teaching of medicine, pediatrics, psychiatry, obstetrics, surgery, and other clinical subjects. Dr. Perrin Long, Professor of Preventive Medicine at Johns Hopkins University School of Medicine, has expressed the view that the aim of a department of preventive medicine "should be one of gradual self-extinction. Its success should be considered complete when, due to its efforts and endeavours, the level of instruction and practice of humanistic medicine has been raised to such a point in all departments in a medical school that the continued presence of a department of preventive medicine is unnecessary." This advice has been criticized as being impractical, but it was presented as a long-range aim, not an immediate objective. There are few, if any, schools of medicine in which an adequate level of instruction and practice of humanistic medicine has been reached in all departments, but in most schools there are a few such departments. The immediate duty of a department of preventive medicine is therefore to concentrate on the teaching in those fields which are not adequately covered and to encourage the preventive viewpoint within those departments. For this reason courses will differ widely from one school to another.

In Dalhousie University the courses begin in the first year and carry through to the end of the fourth year. In the first year an introductory course is given which aims at early cultivation of the viewpoint that prevention, diagnosis and treatment are integral parts of medicine as a whole, and that the study of medicine is the study of man, not solely of his ailments. Dean Grant first discusses the scope of modern medicine, trends in practice, the relation of the basic sciences to the general practice of clinical and preventive medicine and to the various specialties. He also presents in three or four lectures a brief historical outline of some of the major advances in clinical and preventive medicine. One orientation lecture is also given by the speaker on attitudes toward the study of medicine, and practical advice on methods of study. The second section of this course consists of a presentation of certain basic principles of sociology and economics relating to medicine. The student is encouraged to retain his interest in man as related to his total environment, and not to concentrate solely on his physical ailments. Several sessions are occupied by discussions of population trends and their effect on medicine, and of costs and distribution of medical, nursing, hospital and health services and their relation to trends in medical economics. The third section of this first-year course consists of a series of lectures and class discussions on the critical evaluation of modern medical literature. In this an attempt is made to develop habits of self-education by use of recent journals, and it is hoped that at least some students will carry the habit through their training and beyond graduation. A few basic principles of logical reasoning are emphasized and only a bare minimum of statistical tests. These are presented by Dr. Mainland, Professor of Anatomy. Most of the class exercises are related directly to clinical medicine by using examples from current literature dealing with problems of diagnosis, treatment or prevention—not vital statistics or public health.

In the second year a course integrated with bacteriology and parasitology is given to present the basic principles of epidemiology and of the control of bacterial and virus diseases. In this course emphasis is placed on the dual responsibility of the public health specialist and of the medical practitioner for the health of the people. In the latter part of this session eight lectures dealing with vital statistics, environmental sanitation and public health administration comprise the whole course of public health per se. The aim is to give a general picture of the activities and responsibilities of the public health departments for community health and to show how the clinical practitioner may assist and in turn be helped by them. For example, we think that a student should know enough about the value of pasteurization of milk and how to answer arguments against it, that he can lend private or public support to the health officer, and we believe that this is more important than for him to know anything about engineering details of equipment or technical methods of operation of a milk plant. Some details of methods, particularly in rural sanitation, are discussed at this time, but again, only because it is useful knowledge for the practising clinician.

In the third and fourth years the clinical aspects of preventive medicine are presented, for the most part in seminars and clinics. We have replaced

three didactic lectures per week with one lecture and one seminar per week. On Saturday the lecturer gives a general outline of the subject to be discussed and assigns certain reading from textbooks and journals. Three seminar groups of 18 students meet at different times during the following week. At least two and usually three members of the teaching staff of the department attend these seminars. Their duty is to stimulate student discussion, not monopolize it. Practical demonstrations on clinic patients are sometimes introduced to start discussion, such as children with different smallpox vaccination reactions. When diphtheria is the subject, the students do Schick tests on each other one week, and the reactions are observed and serve to start discussion on the following week. Most seminars are opened by the presentation of a typical problem of everyday practice which the students are encouraged to discuss. We believe these seminars have greatly increased student interest. They emphasize the practical features of prevention, and they give us a better opportunity to help the individual student who is having difficulty. We do not know yet whether these students will do as well in written examinations, particularly of the type set by the Medical Council of Canada which usually places more emphasis on public health than is, in my opinion, justified in an examination for licensing in clinical medicine. However, we are hopeful that our graduates, regardless of examination grades, will practise better preventive medicine.

Several of the seminar sessions are devoted to medical economics and systems of practice. Papers prepared by the students themselves are presented and discussed by their classmates and the staff. At one evening session for the whole class several medical practitioners with different views on health insurance and a representative of labor present their views at a round-table discussion with student participation. This has proved very popular.

In the fourth year we are introducing this autumn a system of joint clinics with the Department of Medicine at the out-patient clinic. In the past students were assigned patients from various clinics and were required to make visits to their homes in order to observe the effects of environment in all its aspects. Written reports were submitted on these home visits. Many of these were very well done and the visits were of definite value, but there was a tendency for some students to view this as a housing survey with attention given wholly to the environment, not to the patient. The change in plans will now permit the discussion of these cases directly with the students and social workers at a separate clinic session four or five days after the assignment. The student himself will obtain the medical history and examine the patient at the clinic, do the social follow-up and discuss the case at the next clinic. It is too early to comment on this new program, but it now gives us the opportunity to discuss individual cases rather than read written reports and to integrate our teaching with clinical medicine. It also permits us to continue the teaching of preventive medicine up to the end of the academic course. We hope this will mean a greater carry-over into practice.

We do not suggest that this program is the best possible, or that we have solved all our problems at Dalhousie. However, we think we are moving in

the right direction in emphasizing the clinical aspects of social medicine. In fact, we are only continuing a trend which has been in progress at our school for many years. To my knowledge Dalhousie was the first school to introduce the case study of clinic patients in their homes as a method of acquainting students with the social aspects of medical practice. This was introduced more than twenty years ago. In some clinical fields, notably obstetrics and psychiatry, our Department does not need to put much emphasis on the teaching of preventive medicine, which has been maintained at a high level for many years. In other departments progress is being made. However, it will probably be a few years before we achieve the happy position suggested by Dr. Long, when we will feel justified in recommending our own extinction as a department.

Finally, we do not consider that we are in any respect belittling public health by recommending less emphasis on its teaching at the undergraduate level and more on clinical preventive medicine. On the contrary, we are elevating it to the post-graduate status which it deserves.

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Opportunities for a Program of Stream Sanitation in New Brunswick

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IT is hoped that the writer of this paper may not be accused of provincialism for bringing before the meeting problems that to the rest of Canada may seem to be of a local nature Although stream sanitation may not be as closely allied to the prevention of disease as immunization, pasteurization, and other public health projects, it should be the concern of every Canadian. Visitors to these Maritime Provinces are greatly impressed with the scenic beauty of the countryside and the recreational facilities in the way of hunting, fishing and bathing. These natural assets are the life of our tourist industry, which when measured in the terms of revenue amounted to $282,000,000 last year for all of Canada. New Brunswick's share of this amount is considerable because this Province has so much to offer in the way of outdoor recreation.

It is only natural that the general attraction of a Maritime Province is its water, for without it in abundance and purity, fishing and bathing would be greatly curtailed. It is often said that water is the source of life and the greatest contributor to our civilization. Without it agriculture is impossible and industry is non-existent. In the light of this, can we as citizens of this Canada of ours afford to allow our water resources to be used in such a way as to impair their natural state? It is generally accepted today that stream sanitation is feasible in an industrialized community if the aids of sanitary science are employed. Although th Province of New Brunswick is noted for its beautiful rivers, lakes and streams, not to mention its salt-water bathing, which is unsurpassed by any other Province in the Dominion, the problem of stream pollution is gradually developing.

When one looks back to the early part of this century, one sees a province in a rather arrested state of progress. The ship-building industry was drawing to a close, the long lumber industry was waning, and the pulp and paper mills were beginning to appear. It is only natural to assume that water and sewerage facilities were very few and the majority of our rivers were receiving little contamination other than the natural run-off. It is fortunate that five of the six pulp mills in our Province discharge into tidal waters and are believed to contribute little in the way of stream pollution. However, a survey has never been made by the Province to fully support this assumption.

Presented before the Public Health Administration Section at the thirty-seventh annual meeting of the Canadian Public Health Association, held in the Nova Scotian Hotel, Halifax, June 27-30, 1949.

The cities of New Brunswick were the first to install water and sewerage services and again our maritime position was a great help in saving our streams from pollution. Saint John is on coastal waters and Moncton is served by the Petitcodiac River, so famous for its tidal bore which scours the river bed twice a day; it is indeed nature's concept of the flush toilet. The position of Fredericton is not so favourable and it is regrettable that so fine a city must discharge its waste into the beautiful Saint John River. In reality, the River Saint John serves as a sewer throughout its entire length along the western boundary of New Brunswick.

As in other parts of Canada, there has been a general demand for water and sewerage services throughout our Province, resulting in a marked increase of sewage discharge to streams and rivers. Within the last two years municipal sewerage systems have for the first time been discharged into the Nashwaak and the Tobique, rivers of international fame. Although the character of these rivers may not be greatly altered at present, the thin edge of the wedge has been inserted and the door is now open to further pollution. A number of other streams and lakes will suffer the same fate as soon as the riparian towns and villages are able to afford water and sewerage services.

It would be an oversight to discuss a problem of this nature without giving some thought to the shell-fish industry. New Brunswick is famous for the high quality of its shell-fish, particularly lobsters and oysters. The latter are of particular significance to us because they are considered a delicacy by many when served uncooked. The shell-fish industry in New Brunswick is regulated by the Federal Minister of Fisheries. The Department of National Health and Welfare makes surveys of the shell-fish areas to determine if the beds are free from pollution. If, in the Department's opinion, the areas are so contaminated as to make shell-fish taken therefrom unsafe to use as a raw food, the areas are closed under the Fisheries Act. It might interest you to know that although many barrels of oysters of the finest quality are exported from the Province annually, there are many areas that are closed or partly closed to oyster fishing due to the contamination of our coastal estuaries. In this group we have Buctouche River, Richibucto River, Shediac Bay, and portions of Lameque Bay and Cocagne Harbour. All of these names are familiar to people who appreciate fine oysters. Clam beds are practically in the same category and the Department of National Health and Welfare closes the clam-digging areas as soon as sewers are discharged adjacent to them.

It is regrettable that this stringent control is not extended to bathing places to protect people from swimming in polluted waters. It is not uncommon to see people bathing in the close proximity of sewer out-falls. Records show that no outbreaks of water-borne diseases can be attributed to bathing places in the Province. There are, however, a few cases of typhoid fever on record that were traced to polluted shell-fish beds.

Although the situation as outlined in this paper does not present a very progressive overall picture, a little progress has been made in the field of stream sanitation. The Department of Industry and Reconstruction is formulating a stream development program with the aim in view of increasing

the utility of some of our streams by providing better facilities for fishing and preserving some of the natural beauty of these locations. It is felt by some in our Province that too much emphasis has been placed on the salmon pools that are beyond the means of the average tourist, not to mention our own residents. This plan, when completed, should afford an opportunity for fishing and recreation for all.

A stream control commission has not yet been formed in New Brunswick. Nevertheless there are those who are farsighted enough to see the value of a sewage treatment plant. When the town of Shediac drew up its plans for extended water and sewerage services early in 1948, they were approached by the Department of Health and advised that further pollution of Shediac Bay would tend to spoil its greatest asset, namely the bathing beaches at Point du Chene. The town was very receptive to the suggestion of a sewage treatment plant and they are pleased to announce that the first sewage treatment plant in New Brunswick will be officially opened in July of this year. The future of one of the finest bathing beaches in the Province is now secure.

The foregoing is an example of the value of education in the public health field. It is for this reason that the New Brunswick Department of Health and Social Services has provided its Sanitary Engineering Division with a mobile laboratory to carry out educational work in the field of sanitation in the rural areas. After the initial work in water and milk sanitation is completed, it is proposed to begin, in a small way, the groundwork for a stream sanitation program. It is felt by the Department that if the people are kept sufficiently informed on all matters of public health, the greatest obstacle in our task will be overcome.

Diphenan in the Treatment of Enterobiasis

E. KUITUNEN-EKBAUM, PH.D.
School of Hygiene, University of Toronto
and
DOROTHY M. JAMES, M.D.
Physician to the Infants' Homes of Toronto

THERAPEUTIC trials with Diphenan (p-benzylphenyl carbamate) were undertaken with the hope of finding a drug for the treatment of pinworm infection which would be more effective and less toxic than the drugs in use at present. In 1941 and 1946 the results of therapeutic trials with phenothiazine were published (1, 2). These showed that phenothiazine was an efficient anthelmintic against pinworms. Because of reported toxic reactions in certain individuals (3, 4, 5, 6, 7) and because of its instability (8, 9), the drug has not been distributed for general human use. Gentian violet is considered at the moment to be the best available drug against pinworms, but unfavourable reactions are occasionally encountered.

The British Drug Houses (Canada) Ltd. placed a generous supply of Diphenan at our disposal, in order to carry out toxicity tests on animals and therapeutic trials on children infected with pinworms.

Procedure and Results

Toxicity tests were carried out in the School of Hygiene, University of Toronto, with 40 albino rats weighing 125-150 grams (average 140 gm.) and 40 mice weighing 18-25 grams (average 20 gm.). Twenty rats and 20 mice each were fed by stomach tube daily for 20 days with 0.5 mgm. of Diphenan per gram of body weight. The other group of 20 mice and 20 rats each received 1 mgm. per gram of body weight. The drug was given as a suspension in 5 per cent gum acacia. Ten rats and 10 mice were kept as controls. Haemoglobin estimations were made by Hellige haemometer before and at the completion of the experiment. The haemoglobin content was expressed in grams per 100 c.c. of blood. It was observed at the termination of the experiment that the test animals as well as controls had gained weight and the haemoglobin levels were in the majority of cases slightly but not significantly higher than before the experiment.

Histological sections were made of spleen, liver and kidneys of 2 of the test rats and 2 test mice. No pathological changes were evident.

The results of the experiments showed that mice and rats tolerated the medication over 20 days without ill effect.

Therapeutic Trials in Humans

The group included 110 children and 6 adults. The majority of the children treated were those under the care of the Infants' Homes of Toronto.

The presence of pinworms in these children was detected by the NIH swab method, with the exception of a very few in whom the parasite had been detected by the physician.

The method of administration and the dosage of Diphenan as suggested by the British Drug Houses, was modified as shown in Table I. The total

TABLE I
DOSAGE OF DIPHENAN USED IN VARIOUS AGE GROUPS

Age Groups	Number of Tablets 0.5 gram each			
	Single Dose	Daily	Weekly	Complete Course
Up to 2 years	0.25	0.75	5.25	10.5
2-5 years	0.5	1.5	10.5	21
6-9 years	0.75 (0.5)	2.5 (1.5)	15.75 (10.5)	31.5 (15.75)
10-13 years	1	3	21	42
Adults	2	6	42	84

dosage remained essentially the same as outlined by the British Drug Houses except that the age group 6-9 received a larger dosage than that indicated in their leaflet. The numbers in brackets show the British Drug Houses dosage; elsewhere their dosage is similar to that used in the present series.

The drug was given over a period of 7 days followed by 1 treatment-free week and continued for another 7 days.

One week after the completion of the treatment, or in some cases over a longer lapse of time, 7 post-treatment swabs were taken on 7 consecutive days in order to evaluate the effect of the treatment.

The results, as obtained by the post-treatment swabs, are outlined in Table II.

TABLE II
THE RESULTS OF TREATMENT WITH DIPHENAN OF 73 CHILDREN INFECTED WITH *Enterobius vermicularis*

	Cases Given One Course Treatment	Post-treatment Swabs Positive	Post-treatment Swabs Negative	Cases Given Second Course Treatment	Post-treatment Swabs Positive
Boys	47	31	16 (34%)	9	6
Girls	26	9	16 (62%)	4	4
Total	73	40	32 (44%)	13	10

Table II shows that of 73 children (47 boys and 26 girls) who were treated with Diphenan and examined by the NIH method, 32 (44 per cent) showed no ova on the post-treatment swabs. In 40 cases the post-treatment swabs were still positive. A second course of treatment was given to 13 children. Post-treatment swabs of 4 were negative whereas 10 still showed ova on the swabs after 2 full courses of treatment.

An additional 37 children (23 girls and 14 boys) were treated with Diphenan. Post-treatment swabs were not taken although in all cases these were supplied and it was requested that they should be taken.

The drug was well tolerated in all cases without any untoward reactions.

The 6 adults treated with Diphenan were apparently all cleared of the infection. Post-treatment swabs of 3 adults were negative after 1 course of treatment. Two adults had to be treated twice before the swabs became negative. No swabs were received from 1 adult. One case was of particular

interest. A young man, heavily infected with pinworms and suffering aggravating symptoms, was previously treated with 10 grams of phenothiazine taken over 5 days. The post-treatment swabs were positive and the symptoms persisted. A second course of phenothiazine treatment was given after 1 month had passed, and similarly the symptoms persisted and the post-treatment swabs were positive. Diphenan was then given 4 weeks after the completion of medication with phenothiazine. The dosage used was that outlined by the British Drug Houses for adults: 6 tablets daily for 7 days repeated after 1 treatment-free week. The symptoms disappeared and the post-treatment swabs were negative.

Discussion

The results of these experiments show that Diphenan was well tolerated by experimental animals. No untoward reactions were reported in 110 children and 6 adults who were treated for pinworms.

It should be stated that the group of children used in these trials was a very difficult group in which to evaluate the results of the treatment. The fact that pinworm infection is a family infection has been well demonstrated by numerous surveys and studies carried out in the United States, especially in the National Institute of Health, Bethesda, Md. (10, 11, 12, 13). The children treated in this series were living in different foster homes. In most cases the foster mother had her own children, and although some of these were included in this group, the majority of these were not examined or treated. There remained thus a possibility of a source of infection either from other infected children or contaminated surroundings.

The number of adults treated is too small but the results of these investigations seem to indicate that the dosage of Diphenan for adults is more adequate than that outlined for children below 10 years of age.

The results of these trials indicate that Diphenan is not a completely effective drug in the treatment of all cases of enterobiasis. However, it may be of real value in treating the patients intolerant or refractory to gentian violet or other drugs in use. Moreover, in the treatment of small children Diphenan is of value because of ease of administration.

ACKNOWLEDGMENTS

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A MODERN PLUMBING CODE

PLUMBING is more important today than at any previous time. In addition to the considerations of public health, there is an important economic factor in view of the great expansion in the volume of building. It is essential that plumbing installations shall conform to modern standards which reflect the findings of research and are in accord with scientific facts. Definite economies can be effected by the application of this newer knowledge.

There is great variation in the plumbing codes which are now in use. Although efforts have been made to regulate standards and to formulate codes that would fit the requirements, many of these codes have been copied, for the most part, from what has been used in the past. This is to be expected where there is no opportunity for research and for investigations into the background of these requirements. In recent years public health officials and others concerned with plumbing have taken a greater interest in plumbing codes and have endeavoured to obtain more information about actual requirements. It has been appreciated, particularly at this time when so much building is being undertaken, that an effort should be made to formulate requirements which will be up-to-date and will not involve unnecessary expenditures on the part of the property owner in providing proper plumbing for the protection of health and for convenience.

One of the difficulties has been the lack of uniformity in plumbing codes. The plumber who was doing work in different municipalities found that he had to comply with the code in each place, and sometimes the requirements were diametrically opposite. In other places there have been no codes at all, and with keen competition there may be a temptation to use unsatisfactory materials and to do work which will not meet the requirements. To achieve uniformity, a plumbing code should apply to as large a territory as possible—for instance, a province, or, ideally, the whole of Canada. Once standards have been decided on, the procedure for the plumber is simplified and the costs of manufacturing plumbing supplies are definitely lowered, since the manufacturer no longer has to make supplies of many different types and sizes.

In the Province of Ontario an effort has been made in recent years, under the guidance of the Department of Health, to formulate a plumbing code which might be applicable to the entire province. A committee with representation from all groups concerned has been working for some time and has now completed its studies. The members have kept in mind the need for a simple, uniform

code for the entire province, economizing where economy might be effected without interfering with public health requirements. The members have studied many existing codes and have made every effort to eliminate unnecessary requirements and to base the code on proven facts as far as possible. As a result, if the code is adopted, the cost of plumbing should be reduced substantially. At the same time, it will ensure that the property owner is adequately protected against defective workmanship or potential health hazards.

The work of this committee, sponsored by the Department of Health of Ontario, is to be highly commended, and it is hoped that the code will be accepted by the Province and put into effect. Provision is made in The Public Health Act of the Province for adoption of the code as a regulation which might be applicable across the province. The standard would thus be set for the province at large, although it would be enforced locally. It is hoped that the code may be helpful in securing action along similar lines by other Provinces and that, ultimately, uniformity across Canada may be achieved.

SMALLPOX IS STILL A MENACE

THERE IS no drug, chemical or antibiotic, which has been shown to be specific in the treatment of smallpox. When it occurs in the haemorrhagic or severe confluent types, there is probably no more loathsome nor more deadly disease. Outbreaks of a mild form of the disease, described as Alastrim, have occurred on this continent and in various parts of the world, and their occurrence has given rise to an impression that the character of smallpox may have changed. In Canada, the absence of any cases of smallpox for several years has tended to reduce the public's appreciation of the importance of vaccination. However, the outbreaks in Seattle in 1946, in New York in 1947, and now in Glasgow, Scotland, indicate that virulent smallpox is still a menace; in fact, air travel makes it possible for the disease to be brought from distant lands where thousands of cases still occur. In Glasgow, a score of cases followed exposure to an Indian sailor who arrived in London on March 5 and travelled to Glasgow while the disease was developing. In addition to the patient, five others lost their lives, including a physician who, it was stated, "did not believe in vaccination", and two others of the hospital staff.

Medical science is unable to meet the ravages of smallpox apart from the use of vaccination. It is known that a very substantial part of the population of Great Britain is unvaccinated. There are reasons for this, which fortunately do not apply in Canada. In the Montreal epidemic of 1884, in the Windsor epidemic of 1924, and in other outbreaks, the effectiveness of vaccination was demonstrated beyond question to the people of Canada, and they have continued to endorse vaccination. The price of safety through vaccination is small. Infancy is the time when vaccination should be performed, as reactions are then at a minimum. Vaccination in the presence of an epidemic results in mass vaccinations, providing conditions which are far from ideal and tend to result in accidents.

In this issue, Dr. D. B. Avison draws attention to the essential points in the diagnosis of smallpox, and from his wide experience in this disease in the Orient, reminds us of the great importance attaching to the diagnosis of this disease which, if missed, may result in serious outbreaks.

Letter to the Editor

CLINICAL DIAGNOSIS OF SMALLPOX

Sir:

The recent outbreak of smallpox in Glasgow indicates the folly of the trend toward weakening our emphasis on vaccination. Many doctors have, by their attitude, given tacit approval to the too common thought that smallpox is a disease of the past and that immunization can be discontinued till and if the disease makes its reappearance.

It is important, of course, that doctors be able to diagnose quickly the first and subsequent cases of smallpox that make their appearance in a community. Smallpox has become so rare a disease in this country that early cases may be missed or there may be considerable delay in arriving at a correct diagnosis, and it is with the idea that the experience of one who has seen many of these cases in the Orient may be of assistance that this letter is being written.

The only disease, or at least the most common disease, that one might confuse with smallpox is chickenpox, and on first thought a severe case of the latter might cause difficulty because we hold the opinion that smallpox is necessarily a serious disease. Where, however, a person has been immunized against smallpox in infancy or where smallpox is endemic, one not infrequently encounters cases where both general symptoms and rash are light, and it is these cases that appear to give rise to difficulty. Let us try to forget the lightness or severity of a case and consider the important points on which diagnosis depends. These are:

1. History:
   (*a*) of contact;
   (*b*) of presence or absence of previous attack;
   (*c*) of presence or absence of prodromal symptoms;
   (*d*) of the manner in which the rash developed.
2. Present distribution of the rash.

A definite history of contact with a known case of either smallpox or chickenpox is certainly of help in diagnosis, though, unfortunately, all too often no such history is obtainable.

The writer has never seen a patient with a second attack of either smallpox or chickenpox and histories of previous attacks must always be accepted with reserve. Cases of pseudamina have been confused with chickenpox and in the course of physical examinations one is frequently told that a patient has had smallpox on whom there is no evidence of such an attack and who when vaccinated may produce a primary successful take. With these cautions in mind, a reliable history of previous attack for practical purposes rules out one or the other of smallpox or chickenpox.

Very important in diagnosis is the history of the presence or absence of prodromal symptoms. While in chickenpox there may be a history of slight malaise for perhaps a day before the rash appears, this is exceptional, and in the vast majority the rash comes out of a clear sky and is discovered almost by accident by the mother when dressing or undressing the child. Smallpox, on the other hand, even in light cases, gives a definite history of about four days of malaise with some fever, headache and backache, with these symptoms exaggerated in the more severe cases.

We now arrive at the place where the doctor inspects his patient for the first time. He has inquired about the history of presence or absence of previous attacks, as to possible contact and as to the manner of onset, and now turns to view the patient.

In chickenpox the rash develops in successive crops over a number of days, so that on inspection he will see in any one area the "dew drop" typical vesicles, the little red spots of the pre-vesicle stage and, if the case is a few days' old, well-formed scabs. This concomitant presence of rose spots, vesicles and scabs and the history of new ones coming out is typical of chickenpox and in contrast with smallpox in which the rash develops as a relatively single crop so that early we have a wide-spread red rash, then a wide-spread vesicular or pustular rash and finally a wide-spread scabby rash, the whole process from rash to pustules being complete usually within forty-eight hours.

The final clinical examination notes how the rash is distributed. The presence or absence of rash on the palms or soles or in the mouth, like the presence or absence of trabeculæ in individual vesicles, has never been of any clinical assistance to the writer; but how the rash is *distributed is* of immense importance, and this is true whether that rash is plentiful or scant. If one examines the body as a whole, it will be found that, whatever rash there is, in chickenpox it is relatively greatest on the trunk, the upper legs and upper arms with relatively less on the lower arms, lower legs and face, whereas in smallpox the reverse holds true, with a relatively greater distribution on the face, lower arms and lower legs and relatively less on the trunk, upper arms and upper legs.

Finally, in the case of a patient with a well-developed rash who has never been vaccinated, a positive take on vaccination done now will rule out smallpox.

The differential diagnosis of chickenpox and smallpox can, therefore, be summarized as follows:

	Chickenpox	Smallpox
History of contact	Yes or no	Yes or no
History of recent vaccination	.....	Yes or no
History of previous attack	Yes or no	Yes or no
Prodromal symptoms	Usually absent or at most 1 day	Present 4 days
Onset of rash	Successive crops	Single crop
Distribution of rash	Relatively greatest on trunk, upper arms and upper legs	Relatively greatest on face, lower arms and lower legs

—D. B. Avison, M.D., D.P.H., Director, Health Unit No. 3, Metropolitan Health Committee, Vancouver, B.C.

NEWS

Dr. F. W. Jackson Receives Professional Institute Award

FREDERICK W. JACKSON, M.D., D.P.H., director of health insurance studies in the federal Department of National Health and Welfare, was recently awarded the 1950 gold medal of the Professional Institute of the Civil Service of Canada for "the most outstanding contribution to national or world well-being".

The presentation, made by President G. E. B. Sinclair at a luncheon during the Institute's thirtieth annual meeting, honoured Dr. Jackson for his activities and achievements as Manitoba's Deputy Minister of Health and Public Welfare for seventeen years and as the Federal Government's director of health insurance studies for the past year and a half. In the latter capacity he has administered Canada's $31-million-a-year National Health Program for the development and extension of health services.

The judges referred to Dr. Jackson's achievements as Deputy Minister of Health and Public Welfare in Manitoba, including his successful initiation and development of what is known today as the Manitoba Health Plan, as "an outstanding contribution in the field of health and public welfare".

Dr. James H. Baillie Appointed Assistant Medical Director

DR. JAMES H. BAILLIE has been appointed assistant medical director of the Bell Telephone Company, succeeding Dr. Arthur B. Wright. Dr. Baillie will be in charge of health services in the Toronto area and will also assist in the development and co-ordination of health services among Bell employees in the company's Western Area.

British Columbia

THE ANNUAL PUBLIC HEALTH INSTITUTE held at the Empress Hotel, Victoria, from April 11 to 14, was attended by about 175 public health workers from all parts of the province.

The chief speaker was Dr. Nathan Sinai, Professor of Public Health at the University of Michigan, and one of the outstanding authorities in North America on public health administration. He has conducted surveys of medical facilities in a number of States and in Ontario. He is also the author of numerous books on medical economics. Dr. Sinai presented a series of seven lectures to the Health Department staff during the four-day conference.

Other speakers included Mr. A. D. Kincaid, Resident Director, Provincial Hospital Survey; Mr. Harold Campbell, Assistant Superintendent, Department of Education; Mr. John Doughty, Director of the Division of Vital Statistics; Mr. R. Bowering, Director, Division of Environmental Sanitation; Mr. Claude Stonehouse, Senior Sanitarian with the Department of Health; Dr. Charles Hunt, Director of the Division of Venereal Disease Control; Dr. G. R. F. Elliot, Assistant Provincial Health Officer; Dr. W. Hurlburt, Secretary of the B.C. Medical Arthritis Committee; Dr. J. A. Taylor, Director of the Bureau of Local Health Services; Miss Mary Pack, Secretary of the B.C. Division of the Canadian Arthritis and Rheumatism Society; Miss Monica Frith, Director of the Public Health Nursing Division with the Department of Health; and Miss Ruby Tinkiss, Consultant with the Division of Maternal and Child Health of the Department of National Health and Welfare.

Symposiums on Cancer, Arthritis, Prematurity and Local Health Services were included in the program along with presentations on the new high school curriculum in "effective living", international water pollution, the Federal Health Grants, the Hamilton Hospital Survey and the Morbidity Survey.

The Institute is held annually by the Provincial Health Department and is designed to give the doctors, nurses and sanitary inspectors on the staff a chance to keep up with the latest developments in the field of public health.

Saskatchewan

A PREVENTIVE SERVICES BRANCH has been established in the Department of Public Health. This is another step in the move to consolidate into major branches the many divisions in this department. Included in the Preventive Services Branch will be the

Divisions of Nursing Services, Sanitation, Child Health, Communicable Disease Control, Venereal Disease Control, Nutrition, Dental Health, Laboratories, and Vital Statistics.

DR. B. T. DALE, formerly Regional Medical Health Officer for the North Battleford Health Region, has been appointed Director of the Preventive Services Branch. Dr. Dale was born and educated in Europe, obtaining his medical degree in 1931 and his Diploma in Public Health in 1934. Since that time, he has held various posts in public health services in Europe. Prior to coming to Canada about a year ago, Dr. Dale was employed for three years as a medical officer in the British Ministry of Health in London.

SASKATCHEWAN'S FIRST Cerebral Palsy Centre, located in the new wing of the Regina General Hospital, was opened officially on March 29. This centre was completed last October with the cooperation of the Regina General Hospital, the Junior Red Cross, and the Saskatchewan Hospital Services Plan. It is operated by the Department of Public Health through its Division of Child Health. Provision has been made for physical, occupational, and speech therapy, and for a play school. Accommodation is available for the training and rehabilitation of twenty-two child victims of cerebral palsy. Several of these children are hospitalized in the Junior Red Cross Hospital in the new wing, and the rest are out-patients.

DURING THE PERIOD from April 1, 1944, to March 31, 1950, provincial grants in the amount of $1,202,034.51 have been made to 92 Saskatchewan hospitals for construction and equipment, as well as loans amounting to $178,500. Since the Dominion Hospital Construction Grant became available in 1948, federal grants paid to Saskatchewan hospitals up to March 31, 1950, have totalled $424,530.75.

Manitoba

THE SANITARY INSPECTORS INSTITUTE was held March 8, 9 and 10, in Winnipeg, for twenty inspectors from local health units. The Institute was to provide for study of individual and community problems. These topics were discussed: nitrate determination test; frozen food locker plants; supervision of pasteurization plants; procedure in restaurant inspection; and minimum building requirements in slaughter houses. Mr. David Colebaugh, of the West Virginia Pulp and Paper Company, demonstrated the Threshold Odour Test.

THE ANNUAL MEETING of the Manitoba Health Officers' Association was held in Winnipeg, Tuesday, April 4. New officers elected are: Dr. R. M. Creighton of Dauphin, President; Dr. F. K. Purdie, of Griswold, Vice-President, and Dr. Paul L'Heureux, of St. Boniface, 2nd Vice-President. Dr. F. R. Chown of Selkirk was elected Secretary. Dr. M. Langlois, Assistant Director of Health Insurance Studies, Department of National Health and Welfare, Ottawa, addressed the Medical Health Officers.

A THREE-DAY INSTITUTE for medical directors of provincial health units was held in Winnipeg, April 4, 5 and 6. Discussion of problems in their work filled most of the program, but the medical directors heard Dr. R. Whetter of Steinbach and Dr. M. T. McFarlane, Secretary of the Manitoba Division of the Canadian Medical Association, speak on "What the Medical Profession Expects from Health Units." Dr. F. R. Chown, of the Selkirk Health Unit, spoke on "What the Medical Directors Expect from the Medical Profession." Directors attended the afternoon session of the Manitoba Health Officers' Association on April 4 to hear Dr. Langlois' address.

MISS CAROLYN MIDFORTH represented Manitoba at the Dominion-Provincial Nutrition Committee meeting held March 15 and 16 in Ottawa.

TWENTY-SIX PRACTICAL NURSES received their licences at graduation exercises, March 31st, at the Manitoba Technical Institute in Winnipeg. This brought to 250 the total number of practical nurses licensed since the training program started in January of 1946.

FORTY-NINE public health nurses from Manitoba Health Units and special services attended a three-day educational course in April. The course included lectures and demonstrations of phases of their work, such as venereal disease control, maternal and infant care, mental hygiene, and the use of the new telebinocular machine.

THE PRINCESS ELIZABETH Hospital in Winnipeg, designed to care for the chronically ill, was officially opened on March 23rd. Dr. G. W. Ritchie is Medical Superintendent.

Ontario

SEVERAL HEALTH UNITS in Ontario are to obtain more than $15,000 worth of special and technical equipment to be paid for by a federal health grant. The equipment is all of a special type not covered by the ordinary budgets of health units and municipal boards of health. Included is a great variety of items, such as baby scales, portable sterilizers, electric lamps for vision testing in schools, milk sample boxes, light meters and moving picture projectors for health education work. County health units or city health departments sharing in the grant are: Lambton; Leeds and Grenville; Lennox and Addington; London; Oxford County and Ingersoll; Porcupine; Port Arthur; Stormont, Dundas and Glengarry; Welland and District; Wellington; Windsor; York Township; Bruce; Brant; Elgin-St. Thomas; Fort William; Huron; and Kenora-Keewatin.

MR. STUART CLARK recently joined the engineering staff of the Division of Industrial Hygiene, Ontario Department of Health, to fill the position formerly held by Mr. W. E. Boyle. Mr. Clark graduated in mechanical engineering from Queen's University in 1944. In addition to two years' service as Engineer Officer in the Canadian Navy, he has been employed with the John Inglis Company Ltd., Toronto, and with the Abitibi Power and Paper Company, Port Arthur.

JOHN DOUGLAS BAMFORD SCOTT

THE premature death of Mr. J. D. B. Scott at the age of forty-two marks the passing of one of the senior members of the British Columbia Department of Health who, as Director of the Division of Vital Statistics, contributed greatly to the advances in public health generally, and vital statistics in particular. Mr. Scott, a graduate in Arts and Commerce from the University of British Columbia, joined the Division in 1937. He was promoted to Director of the Division in 1941, and since was instrumental in introducing many new methods and procedures. As a result of his foresight, interest and planning, the Division adopted progressive advancements in vital statistics processing, such as mechanical tabulation, the plastic birth certificate and record micro-filming. Under his stewardship the quantity and quality of the work in the Division increased to result in the establishment of a Vancouver office within this past year.

Mr. Scott was a member of the American Association of Registered Executives, American Public Health Association, and Canadian Public Health Association, being a former chairman of the Vital Statistics Section. As Director he was a member of the Vital Statistics Council for Canada, which organization has made valuable contributions toward improvement of national and international vital statistics.

Possessed with an openly pleasant personality, he made friends easily, endearing himself to employees, associates, and confrères alike. To those of us who knew him well, his passing creates a real loss; his friendliness, his counsel and his advice will be missed.